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A PRELIMINARY REPORT ON A STUDY OF FLORAL SOCIETIES IN A RAILROAD SWITCHYARD

CHARLES GILLY

For three years observations have been made on the floras of a number of small localities in the vicinity of Fairfield, Iowa. One of the most interesting of these places is the combined switchyards of the C. B. & Q. and the C. R. I. & P. railroads. The soil surface of this area is composed of three main types, as follows:

- (1) Ballast — which, although composed of a variety of materials — crushed rock, gravels, cinders — should be subdivided as:
 - (a) Loose Ballast, which immediately surrounds the track and is more or less worked over by sectionmen, and
 - (b) Close Ballast, of which the more or less tightly packed paths and roadways between the tracks are composed.
- (2) Earthy Soil — largely Grundy Silt Loam, augmented by dumped soils, is found mostly near the edges of the yards and around or between the various buildings.
- (3) Soil-ballast — a mixture, in varying proportions, of the two preceding types. This occurs in intermediate belts.

Development of the individuals in, and the species-composition of the societies are affected, of course, by the composition and mineral content of the various types of soil, and by the difference in size and compactness of the particles composing the soils. This latter factor governs the water content of the soils and determines the types of roots which will penetrate them. The shade factor is, except in a few places along the north side of buildings, almost negligible.

Eighteen definite sub-areas, of varying sizes have been chosen within the limits of the yards, and a seasonal study of these sub-areas is in progress. No attempt is made, in this paper, to present any of the correlations which are resulting from this study, but an examination of Table I will show something as to the habitat preference of many of the common plants in this area.

Sub-areas 1 and 2 are typical close-ballast areas, the soil consisting mainly of a fine gravel-sand complex. These two areas are a little over four blocks apart at opposite ends of the yards. The soil in sub-areas 3 and 4 is a combination of close and loose ballast. These areas consist of a section of frequently worked roadbed together with the adjacent paths and roadways, and are located about 100 yards apart. Sub-areas 5 to 9 inclusive have a loose bal-

last soil composed largely of a fine cinder-gravel-sand mixture. Sub-areas 9 is partially shaded by a large building along the north side of which the area is laid out. Sub-areas 10 to 12 inclusive consist of adjacent areas of loose ballast and soil-ballast mixture. These sub-areas were so chosen in order that a comparative study of particular plants in both types of soil might be made, and are located about four hundred yards distant from each other.

Sub-areas 13 and 14 have a soil-ballast mixture as a base; the latter is shaded almost all afternoon by the storage shed beside which it is laid out. Sub-area 15 consists of a soil area adjacent to a strip of soil-ballast, and was laid out with a comparison study, similar to that indicated for sub-areas 10 to 12, in mind. The remaining three sub-areas have been laid out to include the typical soil formations in the yards. Sub-areas 16 consists of dumped soil mixed with the original Grundy Silt loam. Sub-area 17 is largely dumped soil and due to its location, adjacent to the C. B. & Q. stockyards, contains a large amount of organic matter. Sub-area 18 is a typical area composed of the original Grundy Silt loam.

This paper is based upon personal observations and the collections made by Malcolm McDonald and the author during the past three years. One hundred sixty-three species of plants, most of which are, of course, the common weeds, have thus far been identified for the area. The species found in the sub-areas are listed in Table I, below, and Table II consists of the list of other species found within the limits of the yards, but not present in the sub-areas under specific observation. Nomenclature, in these two tables, is in accordance to the seventh edition of Gray's "Manual", with the exception of the grasses, and they are named according to Hitchcock's "Manual of the Grasses of the United States".

Table I. Showing Plants Found in Three Types of Soil Areas and 18 Sub-areas *

	Close Ballast		C. Ballast + L. Ballast		Loose Ballast				L. Ballast + Soil and Ballast			Soil and Ballast		S. and B. + Soil		Soil		
**	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1. <i>Abutilon Theophrasti</i> Medic.									X				C		X		X	
2. <i>Acer Negundo</i> L.																		
3. <i>Achillea Millefolium</i> L.							X											X
4. <i>Agrimonia gryposepala</i> Wallr.													X				X	
5. <i>Agropyron Smithii</i> Rydb.													X				X	
6. <i>Agrostis alba</i> L.													X					
7. <i>Althaea rosea</i> Cav.															X		X	
8. <i>Amaranthus blitoides</i> Wats.										X							X	
9. <i>Amaranthus graecizans</i> L.	X				X			X			X	X				X		
10. <i>Amaranthus hybridus</i> L.									X								X	
11. <i>Amaranthus retroflexus</i> L.																X		
12. <i>Ambrosia artemisiifolia</i> L.							X		X	D		X	X		X	X		X
13. <i>Ambrosia trifida</i> L.															X	X		
14. <i>Anthemis Cotula</i> L.											X				X		X	
15. <i>Apocynum cannabinum</i> L.															X			
16. <i>Arctium minus</i> Bernh.															X			
17. <i>Aristida oligantha</i> Michx.	X				X										X			
18. <i>Asclepias syriaca</i> L.																X		
19. <i>Asclepias verticillata</i> L.															X			X
20. <i>Asparagus officinalis</i> L.												X						
21. <i>Aster ericoides</i> L.								X							X			X
22. <i>Aster multiflorus</i> Ait.												X	X	X	X	X		
23. <i>Atriplex patula</i> L.											X		X	X	X			
24. <i>Avena fatua</i> L.	X				X	C				X	X	D	X	D		X	X	
25. <i>Bidens frondosa</i> L.															X	X		
26. <i>Bidens involucrata</i> (Nutt.) Briton					X								X	X				
27. <i>Brassica arvensis</i> (L.) Ktze.							X					X						
28. <i>Brassica nigra</i> (L.) Koch.					X												X	
29. <i>Capsella Bursa-pastoris</i> (L.) Medic.										X						X	X	
30. <i>Carex rosea</i> Schkuhr.									X									
31. <i>Cenchrus pauciflorus</i> Benth.		X			C	C	X	X				X	X	D	X	X	D	X
32. <i>Chenopodium album</i> L.					X		X	X	X		X	X	X		X	X	X	X
33. <i>Chenopodium glaucum</i> L.					X													
34. <i>Chenopodium leptophyllum</i> Nutt.	D		X	X														
35. <i>Circaea lutetiana</i> L.														X				
36. <i>Cirsium lanceolatum</i> (L.) Hill.																	X	
37. <i>Convolvulus arvensis</i> L.													X					
38. <i>Cycloloma atriplicifolium</i> (Spreng.) Coult.					X													
39. <i>Daucus Carota</i> L.																	X	
40. <i>Digitaria sanguinalis</i> (L.) Scop.					X	X								X		X	X	X
41. <i>Echinochloa crusgalli</i> (L.) Beauv.																X	X	
42. <i>Elymus canadensis</i> L. var. <i>robustus</i> (Scribn. & Sm.) Mackenz. & Bush.													X					
43. <i>Equisetum arvense</i> L.									X				X					

* Key: Letters used to indicate abundance of plants. X—moderately abundant.
D—the dominant plant of the society. C—common. R—very few.

** Sub-areas 1-18.

	Close Ballast		C. Ballast + L. Ballast		Loose Ballast				L. Ballast + Soil and Ballast		Soil and Ballast		S. and B. + Soil		Soil			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
44. <i>Eragrostis cilianensis</i> (All) Link.					X	X	X			X				X		X	X	
45. <i>Eragrostis pilosa</i> (L.) Beauv.					C				X		X							
46. <i>Erigeron canadensis</i> L.							X	X	X		X	X	X	X		X	X	
47. <i>Erigeron divaricatus</i> Michx.											X							
48. <i>Erigeron ramosus</i> (Walt.) BSP.													X	D		X		
49. <i>Euphorbia dentata</i> Michx.							X	X							X			
50. <i>Euphorbia Geyeri</i> Engelm.													X					
51. <i>Euphorbia maculata</i> L.					X													
52. <i>Euphorbia Preslii</i> Guss.			X															
53. <i>Geranium carolinianum</i> L.																	X	
54. <i>Glycyrrhiza lepidota</i> (Nutt.) Pursh.															X			
55. <i>Helianthus annuus</i> L.																X	X	X
56. <i>Hibiscus Trionum</i> L.																X	X	
57. <i>Hordeum jubatum</i> L.									X		X		X	X		X	X	
58. <i>Ipomoea purpurea</i> (L.) Roth.																X	X	
59. <i>Juncus tenuis</i> Willd.							X										X	
60. <i>Kochia scoparia</i> (L.) Schrad.					X													
61. <i>Lactuca scariola</i> L.					X				X			X	X	X	D	X	X	D
62. <i>Lepachys columnaris</i> (Sims.) T. & G.												R						
63. <i>Lepidium apetalum</i> Willd.						X												
64. <i>Lepidium virginicum</i> L.							X	X		X	X	X	X		X		X	
65. <i>Linaria minor</i> (L.) Desf.								C										
66. <i>Malva rotundifolia</i> L.						X												
67. <i>Medicago lupulina</i> L.					C		D	X		X	X						X	
68. <i>Medicago sativa</i> L.	X															X		
69. <i>Melilotus alba</i> Desr.	X				X		X		X				X	X	X			X
70. <i>Melilotus indica</i> (L.) All.							R											
71. <i>Melilotus officinalis</i> (L.) Lam.						X											X	
72. <i>Mollugo verticillata</i> L.			X							D			X	X		D		
73. <i>Oenothera biennis</i> L.									X						D			
74. <i>Oenothera laciniata</i> Hill										R								
75. <i>Oxalis stricta</i> L.						X												
76. <i>Oxybaphus nyctagineus</i> (Michx.) Sweet.					X				X			X	X	X	X	X	X	
77. <i>Panicum capillare</i> L.																	X	
78. <i>Panicum dichotomiflorum</i> Michx.																		X
79. <i>Panicum Scribnerianum</i> Nash.													X			X		
80. <i>Pastinaca sativa</i> L.															X			
81. <i>Plantago arenaria</i> W. & K.									C							X		
82. <i>Plantago aristata</i> Michx.								X										
83. <i>Plantago lanceolata</i> L.	X				X												X	
84. <i>Plantago Rugelli</i> Dcne.		X					X		X	X			X	X			X	
85. <i>Poa annua</i> L.																		
86. <i>Poa compressa</i> L.									X	X	X		X			X	X	
87. <i>Polanisia trachysperma</i> T. & G.	X	X			X	X						X		X				
88. <i>Polygonum aviculare</i> L.			X	X	C						X	X	X					
89. <i>Polygonum Convolvulus</i> L.												X	X				X	
90. <i>Polygonum pennsylvanicum</i> L.								X								X	X	
91. <i>Potentilla monspeliensis</i> L.									X					X	X			
92. <i>Radicula obtusa</i> (Nutt.) Greene									X									

	Close Ballast		C. Ballast + L. Ballast		Loose Ballast				L. Ballast + Soil and Ballast		Soil and Ballast		S. and B. + Soil		Soil			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
93. <i>Rubus frondosus</i> Bigel.									X									
94. <i>Rumex Acetosella</i> L.		X		X		X							X					
95. <i>Rumex altissimus</i> Wood.										X	X		X	X	X	X		
96. <i>Rumex crispus</i> L.					X					X	X		X	X	X			
97. <i>Salsola Kali</i> L. var. <i>tenuifolia</i> G. F. W. Mey						X						X		X				
98. <i>Secale cereale</i> L.					X												X	
99. <i>Setaria lutescens</i> (Weigel) F. T. Hubb						X	X		D	D		X			D	X		
100. <i>Setaria viridis</i> (L.) Beauv.						X	X	X				X			X			
101. <i>Sida spinosa</i> L.																	X	
102. <i>Silene antirrhina</i> L.					X												X	
103. <i>Sisymbrium altissimum</i> L.															X			
104. <i>Sisymbrium officinale</i> (L.) Scop.							X				X					X		
105. <i>Solanum carolinense</i> L.													X					X
106. <i>Solanum nigrum</i> L.																X	X	
107. <i>Solidago hispida</i> Muhl.																		
108. <i>Sonchus oleraceus</i> L.													X		X			
109. <i>Sorghum vulgare</i> Pers.																	X	
110. <i>Sporobolus vaginiflorus</i> (Torr.) Wood.									D	D			X	X	X	X		
111. <i>Taraxacum officinale</i> Weber	X		X	X				X	X	D		X	X	X	X	X		
112. <i>Tradescantia reflexa</i> Raf.													X		X			
113. <i>Tribulus terrestris</i> L.	D											D						
114. <i>Trifolium hybridum</i> L.	X					X	D											
115. <i>Trifolium pratense</i> L.														X	X	X	X	
116. <i>Triticum aestivum</i> L.																	X	
117. <i>Ulmus americana</i> L.									C				C					
118. <i>Verbena bracteosa</i> Michx.		X				X	D	X		X	X				X			
119. <i>Xanthium commune</i> Britton															X			
120. <i>Zea Mays</i> L.															X		X	

Table II. Plants found within the limits of the Switchyards, but outside of the subareas listed in Table I.

121. *Acerates floridana* (Lam.) Hitchc.
122. *Amphicarpa monoica* (L.) Ell.
123. *Aster laevis* L.
124. *Avena sativa* L.
125. *Bromus japonicus* Thunb.
126. *Bromus latiglumis* (Shear.) Hitchc.
127. *Cerastium nutans* Raf.
128. *Cichorium Intybus* L.
129. *Comandra umbellata* (L.) Nutt.
130. *Convolvulus sepium* L.
131. *Cyperus strigosus* L.
132. *Dactylis glomerata* L.
133. *Datura Tatula* L.
134. *Ellisia Nyctelea* L.
135. *Erigeron annuus* (L.) Pers.
136. *Eupatorium altissimum* L.
137. *Fagopyrum esculentum* Moench.
138. *Fragaria virginiana* Duchesne

139. *Galium Aparine* L.
 140. *Helianthus hirsutus* Raf.
 141. *Hordeum pusillum* Nutt.
 142. *Ipomoea hederacea* Jacq.
 143. *Lactuca canadensis* L.
 144. *Oenothera muricata* L.
 145. *Panicum virgatum* L.
 146. *Physalis heterophylla* L.
 147. *Physalis lanceolata* Michx.
 148. *Physalis virginiana* Mill.
 149. *Plantago major* L.
 150. *Prunella vulgaris* L.
 151. *Radicula palustris* (L.) Moench.
 152. *Ranunculus abortivus* L.
 153. *Silphium integrifolium* Michx.
 154. *Sisyrinchium campestre* Bicknell
 155. *Solidago rigida* L.
 156. *Tradescantia virginiana* L.
 157. *Trifolium repens* L.
 158. *Verbascum Thapsus* L.
 159. *Verbena hastata* L.
 160. *Verbena urticaefolia* L.
 161. *Veronica arvensis* L.
 162. *Veronica serpyllifolia* L.
 163. *Viola sororia* Willd.
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